

The Use of Video Analysis to Enhance Learning

Group Research Project
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ABSTRACT

The purpose of this study is to examine the effectiveness of the use of video feedback on student learning in physical education. Two classes from one South Carolina high school will participate in two events in regards to strength and conditioning. The two events that will be tested are a 40 meter sprint and a back squat. One class will only use verbal feedback from their instructor and the other class will use the combination of both verbal feedback, as well as, video feedback from the video analysis software program called Dartfish. Students will perform a pre and post analysis and their results will be compared at the end of the semester. Our intention for this study is to examine the effectiveness of using video analysis in physical education as well as find out other supporting information such as teacher and student perceptions about the video analysis integration. An experiment will be performed and narrative data will be gathered from the teacher and students so that we can learn more about the effectiveness in implementing the usage of video feedback in physical education.

INTRODUCTION

Since the invention of the video camera in the 1960's, video feedback has been widely used as a technique for teaching. The weight and price of video machinery has declined in the past 4 decades, which makes this type of technology available to a large variety of consumers. Technological advances continue to become more portable and detailed in the amount of information that can be obtained from a video session (Suby, 2009).

Today, there are over 50 video softwares that are used for video analysis and one of those are Dartfish (Suby, 2009) . Dartfish was originally targeted towards physical education programs (Suby, 2009), but is now being used at the highest level of sports, such as levels in collegiate and professional divisions. Suby remarks that purchasing the software and video camera is the easy part; learning how to apply each method of videotape feedback and spending time utilizing the camera and software is the key to its effectiveness.

The study will be conducted over the course of one full semester containing two high school classes in South Carolina. All participants will receive instruction from the same two teachers regarding how to perform a back-squat and run a forty meter sprint. The participants will take a pre-intervention video in order for the teacher to analyze their performance. Class one will then receive only verbal instruction throughout the course and class two will receive verbal instruction along with using the video analysis system Dartfish. A post-intervention analysis will take place at the end of the course to determine if there were any improvements in the forty meter sprint and back squat. The improvements will be based off of form and time in the forty meter sprint along with form in the back squat. Research will be conducted through teacher and student surveys,

classroom observations, recorded times, and analysis of form to determine an increase or decrease.

This study seeks to answer the question of whether visual technology programs such as Dartfish help to enhance students' learning and how they can be used effectively. Two classes from a South Carolina high school will serve as participants for this study. The students will be selected from a Physical Education course, which focuses on strength and conditioning.

RESEARCH PROBLEM

Physical education teachers have been searching for ways to implement technology within their PE classes. A quality physical education program assists students in developing fundamental movement skills needed for a successful lifestyle of physical activity. It also provides learning experiences that encourage students to question, analyze, reflect, communicate, and apply theories to motor skill development (Harris, 2009). Therefore, the question to examine is whether a visual technology program such as Dartfish help to enhance students' learning and what are the ways in which it can be used.

LITERATURE SEARCH

Modern science and technology allows athletes to be stronger, faster, and smarter. Because of these technological advances, athletes are now able to study their own performance as well as the performance of their opponents, giving them a slight advantage to increase their motor skill development. While the usage of technology in the world of sports is unquestioned, in the areas of other physical activity such as physical education is considered to be far less examined. While searching through some databases for articles that support the usage of video feedback in regards to physical education, they were visibly limited.

Liebermann states that in relation to the use of video feedback, research in sport settings has validated its use in improving motor skills (Liebermann, Katz, Hughes, Bartlett, McClements, & Franks et 2002). This information is important because it lets us know that video feedback has improved motor skills in similar scenarios.

Thomas and Stratton (2006) have stated that experts, institutions, and governments have encouraged physical education teachers to use technology in their classes, but in most cases the use of technologies in physical education is limited.

Weir and O'Connor (2009) note that within physical education, studies have also shown that video feedback can be useful. They go on to mention that it gives students a clearer idea of the executions that they have completed, or those they are about to attempt.

In particular, the specific advantage of Dartfish is that students get to see and compare their own performance. In a similar study in which students were examined through their development of skill and knowledge through a track and field hurdle execution, a teacher who experienced Dartfish noticed that “the students in all groups were more involved and interested in the classes. The use of images and videos for explaining the classes captured their attention better than my demonstrations” (Palao et al, 2012). This statement alone helps us understand that student engagement is one the benefits to integrating video analysis into physical education.

In an overview Dartfish project in New Brunswick, Harris (2009) stated that while observing several P.E. classes that utilized Dartfish, teachers were now allowed to transition from a traditional behaviourist teaching approach to a constructivist approach and were also able to create an environment where students can be active learners. She goes on to say that through her observation and collecting feedback from the teachers and students, students saw for themselves what they were doing and made adjustments on their own. This technique in using video analysis empowers the students to take control of their own learning, to construct their own meaning, and to also develop critical thinking skills.

RESEARCH QUESTIONS

Recognizing this current trend towards technology integrated classrooms, as well as questions of effectiveness and cost concerns, it is crucial to evaluate all components within this study. Therefore, these research questions will serve as a guide:

- Does Dartfish help to assist students in learning motor skills?
- Do the students improve in their motor skills by using Dartfish?
- Do the teachers/students find it beneficial?
- Does it take up too much time or make the time efficient?
- How many students feel they are visual learners?
- What are the costs? (equipment, training)
- What are the teachers/students perceptions of utilizing Dartfish?

In order to successfully answer these questions, we will use a variety of approaches for data collection. We will conduct pre- and post-evaluation, conduct observations, and conduct a survey.

RESEARCH DESIGN

Our research will ultimately have a quasi-experimental and descriptive design in which two Freshman classes in physical education will be studied. In each class there should be about 30 students. In all, a total of 60 participants will be required and the number of students may increase depending on enrollment.

<u>Question</u>	<u>Design</u>	<u>Instrumentation</u>	<u>Statistical Analysis</u>
Does it take up too much time?	Descriptive	Teacher Survey	Narrative Report
Is the cost of the program an issue for your school?	Descriptive	Teacher Survey	Narrative Report
Do the you feel comfortable with using Dartfish?	Descriptive	Teacher Survey	Narrative Report
How often did you use Dartfish in class before this experiment?	Descriptive	Teacher & Student Survey	Narrative Report
What is the teacher's prior experience with using Dartfish (how many years)?	Descriptive	Teacher Survey	Narrative Report
How many students feel they are visual learners?	Descriptive	Student Survey	Narrative Report
Would you like to be able to see yourself	Descriptive	Student Survey	Narrative Report

perform an activity on video, so you can reflect on what you did wrong/right?			
Have you ever used a video analysis system before this? If so, what was it?	Descriptive	Student Survey	Narrative Report
What are the teachers/student perceptions of utilizing Dartfish?	Descriptive	Journal Entries	Narrative Report
Does Dartfish help assist students in learning motor skills?	Descriptive	Interview	Narrative Report
Do the students improve in their motor skills by using Dartfish?	Experimental: Two Groups	Pre/Post Performance test	t-test (independent samples)
Do the teachers/students find it beneficial?	Descriptive	Interview	Narrative Report
Do the students seem more engaged when using Dartfish versus verbal instruction?	Descriptive	Interview	Narrative Report
What are a few additional pros and cons of Dartfish you would	Descriptive	Interview	Narrative Report

like to add?			
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RESEARCH METHODS

Participants

The participants of this study will be two Physical Education teachers along with students of two Freshman level high school Physical Education classes (N=60) in the state of South Carolina. Both teachers have been teaching Physical Education for five or more years and have a year or more experience with the program Dartfish. They also both have prior experience in teaching the correct way to perform a back squat and a forty meter sprint. The students represents a range of social class, race, and gender. One-hundred percent of the participants and teachers speak English. The participants will be separated by class and treatment group.

1. Class One: Verbal feedback from instructor
2. Class Two: Verbal feedback and video feedback from instructor using Dartfish

For this study, class one will be used as the controlled group. The participants in this class are ninth grade students, who are of different social class, race, and gender. Class one does have access to Dartfish, however they will not be using it during their Physical Education class. They will only receive verbal feedback from the instructor throughout the course.

The participants of class two will be used as the experimental group; they are also of different social class, race, and gender. Class two will receive the same verbal feedback from the instructor as class one and will additionally use Dartfish as another source of instruction.

Materials & Instrumentation

A pre-analysis will be constructed for both classes which includes; interviews, surveys, and a pre-test to determine the student's current skills. The surveys will be conducted through Google Docs and the interviews will be conducted via phone or in person two weeks prior to the assessment. The interviews will be semi-structured to allow for flexibility. Both classes will perform a skills pre-test, which will take place on the first day of class and implemented by the instructor. It will include a timed forty meter sprint using a stopwatch and a video of each student performing the sprint and the back squat, which will be recorded using a video camera. The timed forty meter sprint will be recorded using pen and paper and stored safely to assure it does not get lost. If the instructor prefers, the

collected sprint data may be stored another safe way. The videos of each student will be uploaded into the Dartfish program, saved, and labeled with the corresponding student's name.

Procedures

A pre-analysis will be conducted, including interviews, surveys, and a recorded video of each student demonstrating a 40 meter sprint and a back squat. The teacher and student surveys will be given three weeks prior to the start of the class. The teachers' survey will determine; (1) the teachers comfortability with Dartfish, (2) how often Dartfish was used prior to this study, (3) if they deem the program to be effective, and (4) their attitudes towards the program. The student survey will determine; (1) their attitudes towards video analysis, (2) if he or she considers themselves to be a visual learner, (3) prior experience with Dartfish, and (4) gender. One week following the survey (two weeks before the start of the class), both teachers will be contacted in order to conduct interviews regarding their survey responses and any other additional information. The interviews may be done over the phone or in person.

To determine the student's form, strength, and sprint time, a pre-analysis will be conducted on the first day of class using video and a stopwatch. The video will record the students' form, so they will be able to go back and analyze it and compare it to their final form at the end of the semester. The stopwatch will be used to time their forty meter sprint, which they will then compare to their time at the end of the year. The students are expected to achieve a better time in the forty meter sprint as well as better form in their sprint and back squat.

A series of observations will be conducted throughout the course of one semester in order to compose pictures of how Dartfish is used for instruction, examine student engagement (off-task behaviors), explore video instruction duration, teacher interaction, and any other related topics. The observations will be implemented by an experienced observer, who is familiar with physical education and Dartfish.

DATA ANALYSIS PROCEDURES

Once the survey is completed, observations and test data are collected. Once, the data is completed it will then be analyzed systematically. The data and observations will determine qualitative measures such as what teachers and students think about the video analysis system, Dartfish, and how the students perceive their success in the classroom when using the program along with verbal instruction. The sprint times will be used to determine the quantitative measures of student success in the two experimental classes. The controlled class's test results will be used to determine student success without the use

of Dartfish and only forms of verbal instruction from the teacher. The results from the experimental class will determine student success with the use of Dartfish. Data from the two groups will be compared to determine the effectiveness of using the video analysis system Dartfish. Further analysis will also take place to determine if socioeconomic, race, or gender effect the results.

CONCLUSION

The data that was gathered during this research will conclude whether or not the video analysis system, Dartfish, combined with verbal feedback from the instructor helped to enhance students' learning. It will assist in presenting ways in which the system is used as well as measure whether the students made an improvement in their specific motor skill. The data will reveal any implications for the development of future research. This information is necessary for educators to determine whether or not video analysis programs such as Dartfish should be used as a form of instruction, especially in Physical Education classes.

REFERENCES

- Harris, F. (2009). Visual Technology in Physical Education Using Dartfish Video Analysis to Enhance Learning: An Overview of the Dartfish Project in New Brunswick. *Physical & Health Education Journal*, 74(4), 24.
- Liebermann, D. G., Katz, L., Hughes, M. D., Bartlett, R. M., McClements, J., & Franks, I. M. (2002). Advances in the application of information technology to sport performance. *Journal of Sports Sciences*, 20, 755–769.
- Palao, J. M., Hastie, P. A., Cruz, P. G., & Ortega, E. (2015). The impact of video technology on student performance in physical education. *Technology, Pedagogy & Education*, 24(1), 51-63. doi:10.1080/1475939X.2013.813404
<http://www.tandfonline.com/pallas2.tcl.sc.edu/doi/pdf/10.1080/1475939X.2013.813404>
- Suby, Jason. (2009). The Use Of Videotape Feedback In Physical Education. Retrieved May 27, 2015 from http://www.usma.edu/cfe/literature/suby_09.pdf
- Thomas, A., & Stratton, G. (2006). What we are really doing with ICT in physical education: A national audit of equipment, use, teacher attitudes, support, and training. *British Journal of Educational Technology*, 37, 617–632.
- Weir, T., & O'Connor, S. (2009). The use of digital video in physical education. *Technology, Pedagogy and Education*, 18, 155–171.